ESA-074 FINAL Public Report

Introduction: This is the final summary report for Steam ESA-074 at Sterling Chemical's plant in Texas City, Texas that was performed April 4 - 6, 2006 by James A. Eggebrecht. Plant personnel that took active participation in the ESA were Joe Stal, with the assistance of Rick Whitehead, Gary Rogers, and Mark Devore. This group of individuals form the already existing "energy team" of the facility as structured for the Utilities Department. In addition, Dan Davidson, plant utilities engineer, participated in most of the meetings and discussions. They are all experienced, knowledgeable, and have progressed very well in implementing a strong array of energy conservation practices in the past. Additional plant personnel who attended either the initiation meeting or the final closing meeting were Walter Treybig, Senior Vice President of Manufacturing, Bob Grannon, Director of Operations, Dennis Kos, Engineering Manager and Darrell Richardson, Services Manager. Their participation and hospitality made the ESA a rewarding undertaking.

The main plant steam system consists of four large watertube boilers. Three boilers are each 225,000 lb/hr, and the fourth is 350,000 lb/hr. Besides natural gas they also combust plant gas and styrene tar. Active steam headers are primarily at 630 psig, 210 psig, and 65 psig. Some units in the production facility use steam at additional pressures that are generated using waste heat steam generators, which could not be modeled using SSAT. Information for the steam trap and steam leak data was taken from the styrene monomer and phthalic anhydride units. The plant has a total of about 52 turbines driving various motors throughout the facility, and two turbines generating electric power. The plant also purchases steam from outside producers.

This plant has an active and mature steam system that is notable for the existing BestPractices. One boiler employs a feedwater economizer for waste heat recovery. As a whole, the insulation on the piping is in good shape, requiring localized repairs that are in progress.

The energy team composed of the four individuals mentioned above has begun a noteworthy program of focused evaluations, plant worker meetings to foster participation and ideas for energy conservation, and implementation of identified opportunities. There is a well-maintained system for plant records and tracking project results. Specific individuals are tasked with follow through on the identified opportunities.

Objective of ESA: Perform an ESA Steam Assessment of Sterling Chemical's Texas City, Texas manufacturing facility. Plant personnel were trained in the use of SSAT, SSST, and 3E Plus, as well as Motormaster.

Focus of Assessment: Steam

Approach for ESA:

During the first day of the ESA visit we started with the assessment team meeting. This meeting lasted about 30 minutes. The plant's responses to the Plant Intake Questions and the SSST were then reviewed. A plant utility system tour took place to familiarize the ESA steam specialist with the plant's steam systems, and the general condition of the plant equipment was noted by the ESA specialist. The day finished with the available data from the plant records entered into the SSAT program. A preliminary match to the plant operation parameters was reached and data collection for the second day was planned. Plant personnel have been using 3E Plus for some time so they were familiar with operation of the program. A demonstration of Motormaster was performed too. Several plant personnel strongly expressed a desire to have a copy of MotorMaster and a copy of the CD was furnished to the plant site leader.

Second day data collection involved extensive study of the steam line insulation situation and steam leaks in the Styrene and Phthalic Anhydride Units. During lunchtime we viewed the Save Energy Now Industrial Assessment Center lecture on Determining Boiler Combustion Efficiency on-line.

On the morning of the third day the preliminary report was reviewed with the plant contacts and their input was incorporated. The list of potential projects was studied by the assessment team and finalized. The close out meeting was held in the afternoon.

General Observations of Potential Opportunities:

For 2005 this plant purchased over 6,000,000 MMBtu of natural gas. The impact cost used in the analysis during the ESA was the value of $7.00/MMBtu based upon the plants corporate guidance.

The ESA team looked at four possible projects and developed the savings estimate total of $1,895,000/year for them as a group. An increase of boiler efficiency by more tightly controlling oxygen levels is estimated to save about $1,535,000/year. Shortening the time until steam trap failures are fixed will result in savings of about $118,000/year. Reducing the amount of steam leaks and their time-to-repair is expected to save about $125,000/year. Improvements to the insulation on pipes is estimated to save $123,000/year. Because of interaction effects between some of the projects, the total savings of each individual project by itself does not equal the total given above for the projects implemented as a whole. All projects would be considered near-term opportunities. The total savings are about 4% of the expected plant natural gas expenditures assuming the $7.00/MMBtu price.

Management Support and Comments:

Sterling Chemicals Inc. is committed to reducing its energy usage. We recognize that an aggressive energy management plan, that drives efficient, cost effective use of energy, must be implemented. To accomplish this policy, Sterling Chemicals formed an Energy Management Team to accomplish the following objectives:

- Determine where and how energy is being used
- Improve the efficiency of the production and use of steam
- Purchase electrical power and fuel gas at the lowest possible cost
- Optimize the use of electrical power, natural gas, nitrogen, and water
- Eliminate improper use and waste of energy
- Implement sustainable energy savings projects
- Reduce dependency on energy
- Ultimately reduce production cost without reducing reliability

A culture of optimizing energy use will be established. Every employee will be made aware of energy costs and the importance of energy conservation as it relates to Sterling Chemicals, Inc. becoming a low cost producer of commodity chemicals. Efficient use and elimination of waste of energy must become a core value for each employee.

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